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ABSTRACT

With increasing environmental problems, there is a large social demand for environmental policy. Education is a powerful source to fulfill this demand and the Foundation for Environmental Education in Europe's (FEEE's) Eco School program aims to develop awareness of environmental issues and sustainability among elementary and secondary school students. The study presented in this paper investigates the effects of the Eco Schools Project in Cyprus on students' knowledge of and attitudes toward environmental problems. (Contains 10 references.) (YDS)

Primary School Pupils' Awareness of Environmental Issues: The Influences of Teaching Styles and Activities

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INTRODUCTION

Learning to care for the environment is important for the quality of life and future prosperity. For Cyprus, Environmental Education is part of the "Action Plan for the protection of the Environment" set by the Ministry of Agriculture, Natural Resources and Environment, as an important requirement of the general harmonisation and adjustment of the Cyprus legislation to the corresponding legislation of the European Union. The statement indicates that:

> *"Environmental Education should be introduced through every curriculum topic in Cyprus Education, with special emphasis on the Primary and Secondary level of Education" (Ministry of Agriculture, Natural Resources and Environment, 1996)*

Environmental Education programmes exist both in formal and non – formal education with some initiatives already in place in Cypriot schools as a response to the constantly growing demand. However, there is still the need for development and inclusion of an Environmental Education policy in the formal curriculum since its introduction has solely been mentioned in official documentation by the ministry of Agriculture, National Resources and Environment.

In order to convince decision makers of the importance and value of environmental education Bennett (1987) has suggested that:

> *"if we want to convince the educational community that environmental education can improve the curriculum and make it more relevant to students, we must evaluate our programmes (p.14)"*

Such evaluation would not only show the contribution of environmental education for a more meaningful and enriched curriculum, but may also highlight its effectiveness on inculcating environmental awareness and cognition, through examples of good environmental education practice. It would also provide foundations on which to base an environmental education policy.

Fien J. (1999) et al., gives two reasons for a whole school approach to an environmental policy: The first is that every teacher is responsible for infusing environmental education into his/her teaching in order to help students to live and work towards a more sustainable environment for all. The importance of integrating environmental education in all curriculum subjects is also highlighted by the Tbilisi declaration (1978):

> *"environmental education is not to be added to educational programmes as a separate discipline, or programme of study but as a dimension to be integrated into them. Environmental education is a result of reorientation and re-articulation of the various disciplines and various educational experiences (natural sciences, social sciences, arts and letters etc.) providing an integrated perception of the environment".*

Classroom environment and activities out in the open provide useful information and skill acquisition to the students. This will be of no use if the students do not make sense, internalise the acquired knowledge and realise its practical application in real life situations. What children learn in school has to be mirrored in real life. They will not learn to live by the "rules"[1] inculcated by the school if they do not see their teachers and adults in general living by the same rules:

> *"Young people cannot be expected to value the environment if it is obvious to them that it is not valued by the school. It is therefore important that schools should practice what they teach about the environment..." (CEE 1995, Develop an Environmental Policy; A Call for Action for Schools, RSPB)*

This is precisely the second reason for a whole school environmental policy. Fien et al (1999) suggest that a whole school approach "relates to things students learn from non formal aspects of their experiences in school. *It is important that schools operate as a sustainable environment in their consumption and use of resources and management of waste products. In this way they can reinforce the knowledge, values and action objectives of environmental education being taught as part of the formal curriculum".* (p.2, module 2)

There is a growing mandate for such an environmental policy. Countries, signatory to Agenda 21 have produced national plans for sustainable development (local agenda 21) and they require means of supporting these plans. Environmental quality is a common concern and educational systems can respond to this social demand by introducing whole school environmental policies.

The Foundation for Environmental Education in Europe (FEEE) Eco School programme aims to raise students' awareness of Environmental and Sustainable Development issues through classroom study. It provides an integrated system for environmental management of schools using priority issues, such as water, waste and ener-

1. Not in the sense of obeying commands, but rules they set for themselves out of respect for others and for nature..

gy during the first years of the programme's implementation. Schools that have completed the suggested topics have the flexibility to move on to different areas such as transport, health, nature and biodiversity. A key objective is to reduce schools' impacts on the environment by encouraging children themselves to take action. The programme extends learning beyond the classroom and develops responsible attitudes and commitment both at home and in the wider community (FEEE, 1999). Schools with high achievement in the programme receive the Eco Schools green flag, an award recognized and respected as an eco–label for environmental education performance.

RESEARCH AIMS:

The purpose of this study is to:

1. Evaluate the impact of the Eco Schools Project in Cyprus, in particular on primary pupils' knowledge and attitudes towards current environmental issues such as water use, waste management and energy consumption.
2. Examine which factors might contribute to the programme's successful implementation
3. nvestigate how the inculcation of environmental attitudes and understanding of environmental issues, can be influenced by the kind of activity.

The research questions emerge from the research aims.

1. Is there any impact of the Eco Schools Project in Cyprus, on primary pupils' knowledge and attitudes towards current environmental issues such as water use, waste management and energy consumption?
2. Do the following factors affect the programme's successful implementation?
   a. Teacher cooperation and participation
   b. Student participation
   c. Local community involvement
   d. Local authority involvement
3. Is the inculcation of environmental attitudes and understanding of environmental issues, influenced by:
   a. Whole school activities
   b. Age group activities
   c. Indoors activities
   d. Outdoor activities

METHODOLOGY:

In order to answer the research questions, data has been obtained through a combination of research tools and approaches:

The first research tool used was a *comparison test* directed to 675 students of the 5th grade in 7 Eco Schools (experimental group) and 7 schools outside the project (control group) Stratification of the sample facilitated the participation of schools from most parts of the island as well as all school types. (urban – rural, small – big) All Eco Schools (at the time the investigation was held) were 24. The control group was intentionally chosen; in order to ensure compatibility among the schools that would be compared (school size, socioeconomic background of the students' families, students achievement, number of teachers ...)

The questionnaire included questions that evaluated students' cognition and information level about several environmental issues as well as questions (Lickert type) and statements that could provide the researcher with information about students' environmental attitudes and actual commitment. (Leeming C. M. et al, 1995, p.22)

The results of the test also facilitated a ranking of the participating ecoschools according to their performance. The selection of *three case studies* was based on the school with highest performance, the school with lowest performance and the school where the programme appeared to have maximum impact.

A qualitative case–study approach of each of these schools gives information on the importance and effectiveness of factors such as teacher, teaching styles, classroom activities and whole school activities. The research instrument used for the investigation of the influencing factors was *document analysis* of the reports submitted to the National Operator to assist school evaluation (1999/2000). These were comparable because they follow a format of 12 common questions to be answered about the application of the programme. In some of the cases the comparison revealed differences, which could answer some of the research questions too.

Table 1. Eco Schools Evaluation Report Questions

Report Questions	Research Questions
1. Which people constitute the Eco Committee of the school?	RQ2.1-4
2. How was environmental audit organized?	
3. How were the action plan targets decided?	RQ2
4. In which level have you advanced with the target attainment?	
5. How do you monitor and evaluate progress?	
6. Write the number and ages of the children involved in activities through the curriculum and information on the topics covered	RQ2.2
7. Describe your environmental action day.	
8. How was the community informed about the Ecoschool Programme and how did they respond?	RQ2.3 RQ2.4
9. Describe any conducts your school had with the wider community (aid, publicity, financial support)	RQ2.3 RQ2.4
10. Please include your Eco Code and describe the way it was composed.	RQ2.2 RQ3.1
11. Has the Ecoschool Programme experience helped your school in any way?	RQ2.1
12. Other comments	

Finally, a questionnaire directed to all 7 Eco Schools' teachers also provided information about the kinds of activities most commonly used by the teachers.

Table 2: Outline of Methodology and Research Questions

Research Question	Target group (sample)	Research approach	Research tool	Sampling method	Method of analysis
1	5th grade students	Quantitative experimental	Comparison test - questionnaire	Stratified random sampling for control group	Inductive statistics $P \subseteq 0.05$
2a	Teachers in the three schools	Qualitative Case study and qualitative Case Study	Questionnaire School evaluation reports	All teachers 3 Reports already selected in aim 2	Descriptive statistics Document analysis
2b			School evaluation reports	3 Reports already selected in aim 2	Document analysis
2c			School evaluation reports	3 Reports already selected in aim 2	Document analysis
2d			School evaluation reports	(3 Reports already selected in aim 2)	Document analysis
3a 3b 3c 3d	Case study of 3 Ecoschools	Qualitative Case study	School evaluation reports	Selection of the school with the highest score, the school with the average and the school with the lowest achievement score, according to the ranking that resulted from research aim 1.	Document analysis

RESULTS

Students' questionnaire:

The environmental management of the school and the environmental education offered by the Eco School Programme have resulted in the cultivation of positive attitudes towards the environment by the students. These are significantly higher in the eco–schools than in the control

schools. The graph illustrates the difference on the environmental attitudes score, between the 14 participating schools and also presents the ranking of the participating eco Schools, according to their environmental attitudes achievement in the test.

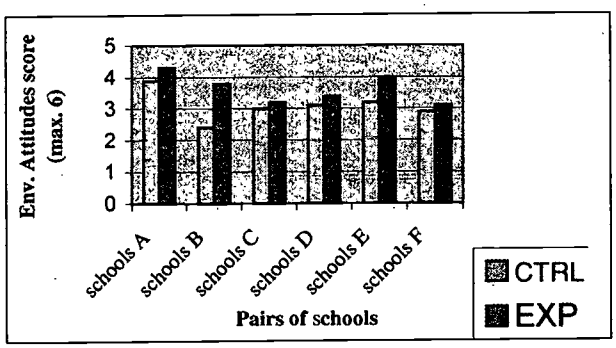

Fig. 1. The programme's impact on students' attitudes.

The comparative study between the school with highest performance (school A), the school with the lowest performance (school C) and the school where the programme had the greatest impact[2] (school B), demonstrated that the differences could be explained by factors such as the teachers' enthusiasm and cooperation, the number and kind of activities used, as well as student involvement in the programme.

Document analysis:

The following pages present only the outcomes of the questions where the results were significantly different. These clearly justify the ranking of the three schools and answer some of the research questions:

QUESTION 1. Which people constitute the Eco Committee of the school? (RQ2)

2. Schools F, could not be used because they were small schools, with onlyy a few students. For the case study we opted for common school types that could be comparable.

Table 3: Teaching staff's participation in Eco School Committee.

	School management	Teacher coordinator	teachers	School cleaners	Child care
School A	2	1	6	1	1
School B	3	1	3	1	-
School C	1	1	9	-	-

Table 4: Local Community's participation in Eco School Committee.

	School maintenance committee	Local authorities	Parents association	Highschool links	Energy specialists
School A	2	1	3	1	2
School B	1	3	1	-	2
School C	-	-	-	-	-

Table 5: Students' participation in Eco School Committee.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Student committee reps	Total
School A	2	2	2	4	4	4	2 (other than previous)	20 (out of 274, entire school)
School B	-	-	-	Not stated	Not stated	Not stated	11	11 (out of 320, entire school)
School C	-	-	-	Not stated	Not stated	Not stated	Not stated	Not stated

School A managed to involve more effectively the entire school community in the environmental committee and especially ensured a balanced participation of children from all ages. They also included specialists to assist them with the topic of the year, which was energy. The same, but in a lower degree were achieved by school B. School C indicates that a greater number of teachers were involved, but they clarify that out of 9 teachers, 6 were initially involved in the programme and eventually, 3 out of 6 opted out before completing their responsibilities. The fact that they also fail to provide the number of students participating in the committee could reveal lack of organisation and commitment.

Information about school and community communication and cooperation were also available in document questions 8 and 9. In all cases, communication with local authorities and community was held through schools' newsletters and members' partic-

ipation in the committee meetings, (which were not many in full body). The help received by the schools from the community and authorities was either financial (for school improvement and maintenance) or had the form of a visit. The visit could be from the school to a place within the community (e.g. oil refinery or power plants) or a visit from a community member, as specialist on energy issues (topic of the year)

QUESTION 3. How were the targets of the action plan decided? (RQ2)

For all schools the committee decided the final targets, taking under consideration the results from the audit and coordinators' suggestions. Only School A used specialized guests to assist the committee meetings and gave the students the opportunity to put down their suggestions. The whole procedure in school A appears to be more democratic and involves a greater number of children (suggestions box available to everyone).

Table 6: Action plan development process

	Decided by	Based on	Applied by
School A	Entire committee	Students suggestions Specialists presentations Adults suggestions (committee members) Coordinator's ideas Environmental audit Previous years experience	All school
School B	Entire committee	Environmental audit Previous years experience	Classroom distribution
School C	Entire committee	Environmental audit PI seminars (coordinator's experience) Previous years experience	Classroom distribution

QUESTION 4. In which degree did the school achieve the targets?

Schools A and B stated that they have completed almost 100% of their targets and school C 75%. Nevertheless, there is a huge difference in the number of targets set by the three schools. School A set 66 targets, school B 18 and C 20. Compared to the size of the school (number of students and teachers), it should be vice versa. Action Plans and the targets are submitted for approval, at the beginning of the year, to the National Operator.

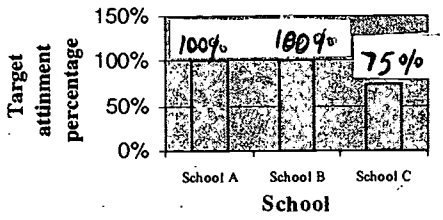

Fig. 2. Target attainment level by the three schools.

The Eco School Award does not imply a competition between schools, but "competition" of each school with itself. Nevertheless, where the differences between the schools are not radical, the differences between the school targets should not be expected to be so. The National Operator should establish target balance among schools. Another important factor for the inculcation of environmental attitudes in school settings, is the school's ability to incorporate the environmental dimension in classroom activities (the school curriculum) and whole school activities. Again the number, and variety of activities applied by school A is much higher than the other two schools.

QUESTION 6. Write the number and ages of the children involved in activities through the curriculum and information on the topics covered. (RQ2.2, Q3)

All schools state that all children participated in the programme. The level of participation, though, varies. While in school A, all children participated in a number of common activities, in other schools the activities were distributed in classes (age groups). In this case, children did not acquire a holistic view of the topic: they only experienced the activity applied by them. This is made explicit by a comment of the teacher coordinator of B Primary school: "... all children actively participated *at a point of the programme*"

In general, the activities performed in all schools were similar. The categories of activities and the number of activities applied in each school are presented in tables 7 and 8. Competitions and patrols for maintaining school grounds clean, saving energy and water were common whole school activities. Some of the schools visited a power plant and an oil refinery station. Guest speakers from environmental organisations visited all schools. Curriculum connections with energy took place in science classes (electric circuits, forms of energy, hazards from electricity and protection measures, etc.) as well as other topics (e.g. food chains, pollution experiments) but not in every school. Nonetheless, the distribution of the activities in the various classes was different. School A distributed all whole school activities to all classes[3] (poetry competition was practically impossible to include the first year due to the limited writing skills of their age) and many curriculum activities were common wherever possible. School B, having a narrower range of ages could apply all curriculum activities in all classes. Nonetheless, not all the activities were directed to all children in the classroom. School C, did not include any activities emerging from the curriculum but they included monitoring activities. Those were distinguished and directed to different classes. Consequently, although the school as a whole could demonstrate a variety of activities, each class had a limited experience of environmental issues. Some of the activities in schools B and C were even applied by groups of children.

The school with highest performance (school A) directed all of its activities to all

3. School A is a school that has united lower and upper primary so children's ages range from 6 to 12, whereas schools B and C include only upper primary (9–12 years old).

classes and in this way achieved two things: firstly everyone was involved in all of the activities, and secondly these activities clearly gave children an obvious common purpose and team spirit. School A was more effective in inculcating environmental attitudes to the students, perhaps because they participated in a great variety of activities in the classroom as well as in whole school activities that offered them a lot of experiences. A common objective, for all students promotes team spirit and dedication to the common purpose.

The activities performed could be distinguished in four categories: indoor activities and outdoor activities, as well as specific age group directed activities and entire school activities. The following table illustrates the variety of activities performed by all schools and their distribution in the 4 categories.

Table 7: Categories of teaching activities

Vs	In doors	Outdoors
Specific Age Group	• Curriculum oriented indoors classroom activities	• Curriculum oriented outdoors classroom activities • Visits • Monitoring and investigations for materials collections
Whole school	• Poetry competition • Song Composing Competition • Assemblies • Guest speakers Material collection (e.g. aluminium tins for recycling, or clothes for Red Cross donations...)	• Tree planting • Patrols (energy saving patrol, water saving patrol) • Garden, school grounds maintenance

Table 8.1: Numbers and categories of activities applied by each school

	School A		School B		School C	
	Indoors	Outdoors	Indoors	Outdoors	Indoors	Outdoors
Specific age group	33 (average 6 activities per class)	4	8 (the same 8 in all classes)	3	4	1
Whole school	12	5	4	4	2	1
Total	54		35		8	

Table 8.2: Numbers and categories of activities applied by each school

Activities	Classroom activities	Whole school activities	Guest speakers	Visits	Total
School A	34	14	3	3	54
School B	24	8	2	1	35
School C	4	4	-	-	8

Teacher questionnaire

Question B2, in the teachers' questionnaire aimed to confirm the variety of activities stated in the evaluation document.

In which degree do you apply the following activities?

(1: none, 2: very little, 3: enough 4: quite a lot, 5: a lot)

Table 9: Activity's application levels

Participation of the class in the annual assembly for the environment	3.57
Tree planting	3.4
Make use of environmental content mathematics problems	2.5
Organise special visits (e.g. forestry department, dams, desalination units, waste disposal units etc.)	2.8
Field study	2.4
Participation in the annual beach cleaning activities	2.57
Make use of "rubbish", for artistic creations	3.51
Essays and assignments about Environment	3.41
Discuss over Environmental Problems (e.g. greenhouse effect, acid rain, pollution etc.)	3.6
Recycling	4.0
Try to minimise waste produced in the class	3.67
Out door study	2.6

CONCLUSIONS

The composition of the environmental committee is important. The participation of the school staff and their cooperation is essential for the successful application of the programme. The work distribution among the teaching staff, makes a programme no one's burden. Support for the programme, also comes through the participation of many members of the local community in many ways. Their active involvement benefits both the school and the society. This general participation along with the participation of a high percentage of the schools students promotes cooperation and strengthens school – community relations as well as teacher – students relations. The global participation into decision making and application also results to a democratic operation of the school functions and enhances the schools team spirit. The equal representation of each class in the Environmental Committee promotes a democratic climate in schools' organizational and administrative procedures. It also facilitates the active participation of the students and promotes their initiative. (Classroom representatives carry class' messages to the committee)

Beyond the operational level, in the cases where the activities for the implementation of the action plan targets involved all school, children were affected by the programme in a higher degree and developed environmentally friendly attitudes. This is

probably due to the team spirit created, and the commitment the children felt. Activities such as guest speakers, or days devoted on environmental issues, offer opportunities for further involvement and information of the children. The kinds of activities described above are out of classroom and community based activities. According to Knapp (1983), these are the precise activities that support action learning, an approach to environmental values education. This approach "provides opportunities to individuals and groups to act on personal values in the context of real issues and problems" (p.24).

The number of objectives often reflects the number of activities performed by each school. As observed in question 4, the more activities performed by the children, the greater is the impact of the programme on the children.

One of the most important factors for the effective application of a programme is the people's feelings about it. Question 11 reveals the feelings that school A holds about the programme: they feel proud of their participation, something that was not stated by any other school. This feeling, essential for the successful implementation, is probably a result of the team spirit emerging from the common whole school activities.

These conclusions cannot be generalized, because of the limited number of schools used for the comparison. They clearly emerge from the case study of the three schools. The results presented above will be investigated further, through interviews with the teacher coordinators and the school director.

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